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ABSTRACT

This document contains guidelines and support materials to assist potential purchasers of computer-based adult literacy (CBAL) systems as they consider which specific system to purchase. Included in the document are the following: guidelines and evaluation criteria (written in question form) pertaining to seven areas affecting the purchasing decision for a specific adult literacy program, a discussion of the best sources for obtaining the information required to answer the questions, guidelines for using the evaluation criteria, and definitions of selected terms pertaining to CBAL systems. The evaluation criteria/questions are organized under the following category headings: equipment; cost, installation, and licensing; compatibility with the adult literacy program; flexibility; management; documentation and support; and sources of further information about individual CBAL systems. A worksheet designed to be used in developing a purchasing recommendation is also included. Appended are a 22-item annotated bibliography of publications about the use of computers in adult literacy programs and CBAL systems and a chart cross-referencing items in the annotated resources with six integrated learning systems: Autoskill, CCC, Josten's INVEST, PALS (Principle of the Alphabet Literacy System), Pathfinder, and PLATO. (MN)

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GUIDELINES AND SUPPORT MATERIALS FOR THE ACQUISITION OF COMPUTER-BASED ADULT LITERACY SYSTEMS

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TABLE OF CONTENTS

GUIDELINES FOR THE ACQUISITION OF
COMPUTER-BASED ADULT LITERACY SYSTEMS 1
Equipment 4
Cost, installing, and licensing 5
Compatibility with program 6
Flexibility 8
Management 9
Documentation and Support 10
Further information 11
Purchasing Recommendation 12

APPENDIX 13
Annotated Bibliography 15
Cross-referencing Index 21
Integrated Learning Systems Overview Chart 23

GUIDELINES
FOR THE ACQUISITION OF
COMPUTER-BASED ADULT LITERACY SYSTEMS

The choice of software for literacy programs should be guided not only by the specific evaluative criteria...but also by the considerations which generally govern the use of other learning materials. (Audrey Thomas)

Purpose of these guidelines:

Deciding whether or not to introduce a computer-based system into an adult literacy program is a multi-faceted process. A wide range of issues need to be considered. These include pedagogical concerns: Does the approach used by the technology support the educational goals and philosophy of the unit? What changes occur in classroom practices? What will be the effects on the learners? These include issues of cost: Is the expense (often very high) worth it? These include issues of support: If we run into trouble, who is there to help us?

The guidelines which follow are intended to assist potential purchasers **as they consider the acquisition** of a computer-based adult literacy system. Seven areas which influence decision-making are identified, a series of questions pertaining to each area is presented, and, on the final page of the guidelines, a summary of the responses to each section is requested. For ease of reference, it is also recommended that the section below be completed.

SYSTEM: _____

EVALUATOR(S): _____

_____

DATE: _____

FINAL RECOMMENDATION: Purchase _____ Do **NOT** Purchase ___

Obtaining information with which to answer the questions:

There are two broad areas for consideration when purchasing a system. These are the issues relating to the delivery system (e.g., type of computers, costs) and the issues of pedagogy (e.g., what can the system do? how well does it do it?) Questions dealing with the first area are normally answered in a factual way, i.e. to operate, this system requires computer X, with memory size Y. The vendor is usually the most reliable source of accurate information concerning these questions.

For questions of pedagogy, however, it is usually best to ask people who are already using the materials for their reactions. This can include yourself! Ask the vendor if you can have the materials on a trial basis. This allows you to use the system with the staff and the students for whom it is intended. The appropriateness of the material for the relevant audience can then be assessed first-hand. As vendors, however, are sometimes reluctant to provide expensive systems for a trial run, the next best approach is to talk with learning centres and individuals who are using the material in which you are interested. (References to users of each system are provided in the Appendix. The vendor should also be able to provide you with a list of users.) In order to obtain a full picture of what a system has to offer, you should talk to those who have had successful, and unsuccessful, experiences with the materials. Given the large expenditure usually involved with the purchase of a system, the cost of several long distance phones calls is probably a good investment.

When direct contact with users of the system is impossible, read evaluation reports of the system under consideration. While not as valuable as talking directly with someone familiar with the system, these reports usually address many of the issues of interest to purchasers. In particular, these reports frequently comment on the effectiveness of the system in a specific environment, and on long-term effects such as the retention of skills by the learner. (A list of sources for such reports is found in the Appendix. The vendor should also be able to provide you with this type of information.)

It may be possible, however, that you will be unable to follow any of the suggestions above. In that case, you should ask the vendor to provide you with answers to your questions. A word of caution, however...remember that the vendor's job is to SELL the system. Don't be blinded by the bells and whistles the system provides. Does the system meet **your** needs? Is the expenditure **worth** the returns? Could you spend the same amount of money, or less, in another way to get equivalent results? (Item 18 in the Appendix provides an interesting set of scenarios to use when working with a vendor.)

Using the criteria:

Review all the questions in the guidelines first. This will acquaint you with the scope of the suggested questioning. Then decide which questions are significant for your situation. You can also consider the sections in any order. If, for example, you wish to address issues relating to content first, start with Section C, Compatibility with Program.

It is strongly recommended that the instructors whose students will be using the materials participate in the evaluation process. Indeed, using an evaluation team consisting of various experts -- curriculum developers, instructors, students, and computer specialists -- will probably result in a truly informed decision being made.

Terminology:

An **Integrated Learning System (ILS)** is an interconnection of computer hardware and software which offers instructional materials and programs to users within a sophisticated management framework. Typically, an ILS uses a network of computers or terminals to teach course content. This material covers a major portion of the mathematics/science and language arts/social science curricula, spanning several grades or levels. An ILS also monitors and reports student performance and, based on those findings, prescribes learning paths.

When either the instructional or management function dominates, other terms are sometimes applied. **Computer Assisted Instruction (CAI)** refers to using the computer for teaching curricular content. Often materials labelled CAI cover a restricted curriculum area and grade level and use a drill and practice/tutorial delivery format. **Computer-Managed Instruction (CMI)** refers to using the computer for managing or tracking students' progress, often with the aid of on-line testing. The instructional materials, however, are not necessarily presented on the computer. Sometimes CMI also has the ability to recommend, based on student performance, a "further" set or sequence of instructional materials.

These *Guidelines* are designed to reflect the full range of concerns associated with the purchase of an Integrated Learning System for instruction in the adult literacy field.

A. Equipment

(This section refers to the specifications of the actual computer equipment needed to operate the integrated learning system effectively and efficiently. It asks you to consider just how the hardware needs of the system can be met with your existing computers, if you have any, and what additional equipment you will need.)

1. Can this system:
    a. be used on a single personal computer?
    b. be networked with other computers? (If YES, what additional memory is required?)

2. What computer (and memory) is required to operate this system:
    a. at present?
    b. in projected releases?

3. A variety of accessories (peripherals) are often associated with delivering computer-based literacy instruction. These include a speech card, a modem, a cd-rom, a video disk player, headphones, microphones, touch screen. For this system, which peripherals are:
    a. required?
    b. optional?
    c. provided?

4. How do the requirements of this system fit with what we already have, i.e., can I use my current:
    a. computers?
    b. monitors (colour?)
    c. printers?
    d. keyboards?
    e. modems?
    f. space for equipment?
    g. print materials/books?
    h. other considerations?

5. Can this system be used from a distant site:
    a. by students to access lessons?
    b. by instructors to access management systems?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

B. Cost, installing, and licensing

(As is true with most major purchases, the costs depend upon how elaborate or how basic a system is required to meet your needs. This section is designed to help you determine the cost of the system you want and precisely what you will be getting for your money.)

1. What is the total purchase price for a complete system?

2. What is included in this price:
   a. disks?
   b. hardware?
   c. networking software?
   d. installation?
   e. shipping?
   f. initial training?
   g. on-going curriculum development sessions?
   h. printed materials required for printing and operation?
   i. updated versions of print and computer based materials?
   j. maintenance (are various schedules available)?
   k. warranty (what is covered by this)?
   l. telephone/FAX (800) help-line?
   m. other features?

3. a. What is the cost of those items in question 2 which are not included in the purchase price?
   b. Are these costs one-time or on-going?

4. a. How many work-stations can this system support?
   b. What is the cost per work-station?
   c. In what way does the unit cost decrease when multiple work-stations are purchased?

5. What discounts are possible:
   a. on the initial purchase?
   b. on future purchases?

6. What issues are associated with starting to use the system:
   a. once purchased, how long will it take to deliver the system?
   b. what are the layout/physical plant requirements?
   c. what are the electrical wiring requirements?
   d. what are the phone requirements, e.g., wiring, touch-tone?

e. how easy is the system to install?
f. how long does it take to install the system?
g. who is responsible for installation, e.g. the vendor, the manufacturer, the purchaser?
h. what is the delivery time for the required print materials?
i. how easy is it to enter preliminary student data in order for them to start using the system?
j. how long does it take for instructors/aides/students to learn to use the system?
k. other?

7. What are the details of the licensing arrangements:
   a. what can be copied or transferred?
   b. is there a restriction on the number of stations that can be used simultaneously with the system?
   c. can the system be merged with other computer packages, e.g., word processing software, graphics software, spreadsheets?
   d. what are the other licensing arrangements?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

C. Compatibility with program

(Integrated Learning Systems are seldom used by adult educators as the exclusive mode of instruction. Normally, they are meant to supplement more traditional teaching. This section is designed to help you determine the degree to which the system fits with your beliefs and practices about teaching and learning.)

1. How does the instructional content fit with our literacy program:
   a. What curriculum areas are included?
   b. Is the content relevant to our goals? (How well does it match?)
   c. This system is compatible with which principles of learning (e.g., whole language, phonics, outcomes based)? List some examples which support your answer to the previous question.
   d. What are the strong areas in the instructional content of the system?
   e. What are the weak areas in the instructional content of the system?
   f. Does the system serve as the dominant means of instruction or as an adjunct to the program?
   g. Does the learner use the system independently of the instructor/tutor?

2. What skills for learning are developed by the system, e.g., predicting, summarizing, paraphrasing.

3. Could the same teaching/learning objectives be met in other, more cost-effective and efficient, ways?

4. What pre-requisite skills are required to use the system?
   a. reading levels of student?
   b. content skills?
   c. computer skills (e.g. keyboarding, familiarization with the system):
      (i) for the student?
      (ii) for the instructor?

5. Is the learning material:
   a. oriented towards adults?
   b. written in clear language?
   c. free from bias and stereotyping?
   d. culturally sensitive?
   e. Canadian content?
   f. of potential interest to your students?

6. What support materials:
   a. are required?
   b. are provided with the system?

7. What initial and on-going training of instructors is required?

8. Does this system require a technical support person to be present while students are working on the computer?

9. a. How long does it typically take a student to complete one lesson?
   b. Can the lesson be accommodated in our timetable?

10. How can this material be used with our students who are physically challenged? (If special adaptive features are required, are they available?, included?)

11. How can this material be used with our students who have learning disabilities? (If special adaptive features are required, are they available?, included?)

12. a. Can this material be used with students whose first language is not English?
    b. In what languages other than English is this material available?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

D. Flexibility

(Adult educators regularly structure literacy programs to meet the needs of individual learners. This section is designed to help you determine just how flexible the computer-based system is likely to be so that your students' individual needs are accommodated.)

1. Can the student alter the pace and sequence of the program, e.g., skip to a new topic if the current one is familiar, go to remedial material as needed?

2. To what extent is the student's progress through the material directed by
    a. the instructor?
    b. the student?
    c. the system?

3. a. Can the instructor change existing content and/or add content?
    b. If yes, how easily can this be done, (e.g., time required, technical skills required)?
    c. Can the instructor change or add tests/evaluations?
    d. If yes, how easily can this be done, (e.g., time required, technical skills required)?
    e. Can the instructor regulate parameters, e.g., percentage correct needed for mastery, number of chances to answer correctly?

4. Can adaptations be made to:
    a. print size on screen?
    b. audio (e.g., turn sound off, change voice)?
    c. other features?

5. How does the learner enter/re-enter the program (e.g., same place each time, select own starting point, computer controlled, instructor controlled)?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

E. Management

(Integrated Learning Systems ordinarily allow the instructor to monitor, record, and report student progress. This section is intended to help you determine these and other types of management potential available with the system.)

1. Does the system:
   a. accept correct answers in a variety of forms?
   b. give students a reasonable number of chances to answer correctly?
   c. provide useful help where appropriate?
   d. re-teach the lesson in another way if the student answers incorrectly several times?

2. Are the responses students receive for their work appropriate (e.g., positive, adult, immediate, constructive, not boring, not annoying) when:
   a. on-screen?
   b. aural?
   c. printed-out?

3. Will the computer-based activities provide our students sufficient opportunity to practice the skill or concept to ensure a reasonable chance for success?

4. a. How does the system evaluate a student's success/progress with the material?
   b. Are the criteria used for success appropriate for our students?
   c. Can the criteria be modified by the instructor (e.g., pass rate changed from 75% to 85%)?

5. Are useful diagnostic evaluations provided where appropriate:
   a. to students?
   b. to instructors?

6. Can students print a copy of their work?

7. What information on test performance (e.g., scores, number of problems attempted) is provided/available:
   a. to students?
   b. to instructors?

8. When/where is information on test performance provided (e.g., on screen at end of test session, stored for future retrieval)?

9. Does the system provide information on "time" variables, e.g., time a student spends per computer session, time it takes to complete a unit, etc.?

10. What security features exist, e.g, back-up systems, limited access to records, protection against 'infected' programs?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

F. Documentation and Support

(Materials designed to enable you to deal with the operational aspects are typically available with Integrated Learning Systems. This section alerts you to questions that will help you determine the nature and extent of support documents and services.)

1. a. What kind of documentation is provided for the students' use?
   b. Is it easily understood?
   c. Is it comprehensive?

2. a. What is the nature and quality of the documentation provided for the instructor's use?
   b. Is it easily understood?
   c. Is it comprehensive?

3. What supports does the vendor offer after installation?

4. Is there a (24 hour toll-free) telephone/FAX help line?

5. What new features (including updates) are being considered for the system?

6. If there are new features, will the vendor supply these free of charge?

7. If there is a "user-group" for this system, how do I contact it?

Record a summary of this section on the last page, keeping in mind the relevance of the information to your situation.

G. Further information

(Issues concerning "in-course" and long-term evaluations of the system and the reliability of the developer and distributer of the system are addressed in this final section.)

1. What do reviews and field testing evaluations say about this system? (e.g., ease of use, target group, retention of learning, transferability of skills, student attitudes)?

2. Who else in the region is using this system?

3. Who developed the instructional materials?

4. How reputable is the manufacturer (e.g., well known for educational materials)?

5. How reputable is the distributor (e.g., prompt and helpful?)

Purchasing Recommendation

RATING: *This can be done through a text summary and/or by numerical weightings. If relative weightings are given to each section of the Guidelines, each user should determine these by taking into consideration his or her unique situation. For example, if you have access to several highly competent computer technicians, the external support available may not be a crucial factor in making your decision; whereas, if such technicians are not available locally, support service might take on a higher weighting. In any event, the Guidelines consist of inter-dependent parts, and the weighting given to each will have to be determined by individual organizations.*

_____A. EQUIPMENT

_____B. COST, INSTALLING, AND LICENSING

_____C. COMPATIBILITY WITH PROGRAM

_____D. FLEXIBILITY

_____E. MANAGEMENT

_____F. DOCUMENTATION AND SUPPORT

_____G. FURTHER INFORMATION

FINAL RECOMMENDATION: Purchase _____ Do NOT Purchase _____

APPENDIX

This appendix contains two interrelated sections. The first section is a an annotated bibliography. The items listed range from position papers on the use of computers in the adult literacy field, to descriptions and evaluations of Integrated Learning Systems. The second section cross-references items in the annotated resources, by number, with six Integrated Learning Systems.

ANNOTATED BIBLIOGRAPHY

1. A Comparison of Computer Assisted Instruction Systems, Career Development and Employment, Alberta, 16 pages, 1992

   This report provides, in paragraph and chart form, descriptions and comparisons of the PLATO, Pathfinder, Josten's Invest, CCC, and Wicat systems. For each system, a wide range of issues is addressed, including the curriculum covered by the system, training and support requirements, hardware requirements, and costs.

2. An Evaluation of the Pathfinder Learning System, Department of Advanced Education and Training, P.O. Box 6000, 416 York Street, Fredericton, N.B., E3B 5H1, 1990.

   An investigation of the use of the Pathfinder Learning System at the New Brunswick Training Centre is presented.

3. Askov, Eunice and Clark, Cindy Jo, "Using Computers in Adult Literacy Instruction", Journal of Reading, pages 434 - 448, March 1991.

   After briefly setting an overview for the use of computers in adult literacy, over 100 "floppy" disk are reviewed. Content and skills, instruction methods, and system requirements are addressed. In addition, a list of software publishers/distributors (in the United States) is provided.

4. Cummins, Patrick, *The Learning Centre: Adult basic education using computers*, The Learning Centre, Ottawa Board of Education. Vol. 1, 64 pages, Vol 2, 108 pages, 1990.

   This two volume report provides a detailed account/analysis of the use of computers in the provision of basic literacy and numeracy instruction at this site. It looks at a wide range of issues, e.g., "learning to use computers", "retention", and "math accomplishments". The project used Macintosh, Apple II GS, and Icon machines with applications software, educational games, and drill and practise programs (the latter delivered using Autoskill).

5. Eggleston, Bryan, Computer Managed and Computer Assisted Learning Systems, Innovations Program, Canada Employment and Immigration, B.C./Yukon Regional Field Office, 10 pages, 1990.

   After providing a brief rationale for using computer-based instruction with adults, the document describes and compares four integrated learning systems: Pathfinder, CCC, PALS, and PLATO.

6. Friesen, Vallory Randall, A Critique of Computer Managed Instruction in the Light of Key Principles of Adult Education, unpublished Master's of Arts thesis, Simon Fraser University, 100 pages, 1991.

   Stemming from the authors experience with students in a learning centre for Native Indian adults, this report seeks "the goals, principles and strategies reflected in current emphases in adult education, and to critique, in the light of those values, the adequacy of CMI (as exemplified by Pathfinder) as an adult learning system.' (pg 2)

7. Literacy Works, Saskatchewan Literacy Network (newsletter), Vol 1, No. 2, P.O. Box 1520, Saskatoon, SK S7K 3R5, 23 pages, June 1990.

   This journal volume included reports from literacy instructors using PALS and PLATO, reviews of several inexpensive computer programs which might be used in literacy programs, and general technology based information such as parts of the microcomputer, a glossary and reference materials.

8. Levin, Benjamin, A Study of Computer-Based Employment Skill Upgrading Programs, available from Mark Foley, Employability Improvement, Employment Policies, Human Resource and Labour Canada, 140 Promenade du Portage, Phase IV, 4th Floor, Hull, Québec K1A 0J9, 1994.

   This study presents a comprehensive descriptions of five systems (Autoskill, PLATO, CCC, Pathfinder and Josten's INVEST). It addresses, mainly in chart form, topics such as potential clients of the system, content, staffing, current uses, evaluation.

9. PALS/Pathfinder Project, Literacy Division, Nova Scotia Department of Advanced Education and Job Training, P.O. Box 2086, Station "M", Halifax, N.S., B3J 3B7, 13 pages, 1990.

   This document reports the findings of a pilot project which included among its objectives (a) determining whether or not PALS is a suitable prerequisite for Pathfinder, (b) determining if both systems can be used in tandem, (c) determining if the Pathfinder curriculum is sufficient for incoming adults in a community college program, (d) determining how motivational both systems are for adults and (e) determining the role of the instructor in delivering the PALS/Pathfinder system. The pilot was carried out with 47 subjects. The only requirements for students entering the PALS segment were that their reading level be LESS than sixth grade level and that they be of normal intelligence. The students in the Pathfinder component entered with reading levels above the fourth grade level. Brief reviews of the CCC and PLATO systems are also include.

10. Pathfinder System, Youth Employment Skills Canada, Inc., Advanced Education and Training, P.O. Box 6000, 416 York Street, Fredericton, N.B., E3B 5H1, 6 pages, undated.

    This paper presents an overview of the Pathfinder system, then identifies benefits and liabilities, particularly as these relate to the New Brunswick "environment".

11. *Position Paper: The Use of computers in Adult Literacy and Software Evaluation*, Computers in Literacy Committee of the Metro Toronto Movement for Literacy, 9 St. Joseph St., Suite 302, Toronto, Ontario M4Y 1J6., 20 pages, 1990.

    This document provides thoughtful commentary on using the computer as TOOL in adult literacy education. Also included are reviews of seventy-five (75) stand-alone pieces of software, listing of organizations which provide information on software, and additional sources of evaluation guides and reviews, including on-line data bases.

12. *Report on the Pathfinder Learning System, the Learning Centre*. Ottawa Board of Education, 3 pages, 1991

    Based on the use of the system with 68 students, this brief (non-statistical) report provides commentary on the use of Pathfinder with adult learners. The validity of the tests provided with each unit, teacher input into student's lessons, and the validity and transferability of the skill building exercises are among the highlighted pedagogical issues.

13. Results of the Evaluation of Autoskill Software, Department of Advanced Education and Labour Program Coordination and Apprenticeship Training, P.O. Box 6000, 416 York Street, Fredericton, N.B., E3B 5H1, 16 pages, 1993.

    This study evaluated (1) the "curricular fit" between the Autoskill software and the curriculum in the Adult Learning Centre in Saint John, (2) the rate and level of participant progress, and (3) student and teacher attitudes toward Autoskill software. Subjects ranged in age from 15 to 23 years. Test instruments were the Canadian Adult Achievement Test (Level A) and an attitudinal survey.

14. Results of the Longitudinal Evaluation of the CCC Instructional System,Program Coordination and Apprenticeship Training Branch Advanced Education and Training, P.O. Box 6000, 416 York Street, Fredericton N.B. E3B 5H1, 30 pages, 1992.

    This document presents the results of a year long study designed to evaluate the use and effect of the CCC system at eight community college sites. The areas of investigation were (1) the rate and level of student progress with the CCC Instructional System, (2) the generalization of skills learned on the CCC System to other contexts, (3) the applicability of the CCC Instructional System to the Basic Academic Upgrading (BAU) and Intermediate Academic Upgrading (IAU) programs, (4) student and teacher attitudes toward the CCC Instructional System, (5) use of the CCC Instructional System in the eight sites and (6) use of the system with remedial students from other programs who are referred to the system.

15. *Sadler, J., Stride Program: Final Report*, Unpublished. Available from Columbia Institute of Canada, Calgary, 1990.

    This report describes a pilot project using CCC with Natives in a Calgary program. Included are anecdotal comments on student progress, information on academic gains, and a description of the program and its components.

16. Sawyer, Don, "Pathfinder, Look Before You Leap!" Native Adult Education Newsletter, pg 8 - 10, October, 1991.

    Commentary on experiences using the Pathfinder system, in particular within a Native community, is provided.

17. Sylvestre, Ken and Lewis, Joanne, Computer Assisted Learning Systems, Evaluation Report, Sorrento Systems, 212 Hawkins Street, Whitehorse, Yukon, Y1A 1X4, 65 pages, 1993.

    This evaluation provides: a perspective on adult literacy needs in Yukon, an evaluation of the capabilities of various Integrated Learning Systems in meeting those needs (Autoskill, CCC, I Can Read, INVEST, PLATO), recommendations of the ILS options which would be most effective in Yukon, given present budgetary constraints and other considerations, alternatives to ILSs and an overview of the use of ILSs in Yukon and in the rest of Canada.

18. Technology Enhanced Learning Project, Proposal Assessment - Phase 2, Literacy Section, Department of Education, P.O. Box 2086, Station "M", Halifax, NS. B3J 3B7. 1993.

    Using a set of scenarios, this document presents questions to ask vendors when they are demonstrating an ILS. For example, when considering the content component of a system, a brief description of "Marie, a 43 year-old Micmac woman...functioning at Level Two of the Academic Upgrading Program...(and having) problems with subject-verb agreements, and sentence structure" is presented. Questions for the vendor, designed to reflect how the system can meet this student's needs, are then offered. A 9 page evaluation form to assist with purchasing decisions is also included.

19. Thomas, Audrey, Literature Review, Computer Software for Literacy Project, Canadian Education Association, 34 pages, 1990.

    This document (1) examines the concept of literacy, (2) explores the use of technology in literacy instruction, and (3) presents an overview of the findings from Canadian and American evaluations of the use of integrated learning systems. The Canadian evaluations discuss the effectiveness of CCC, PALS (used in conjunction with the Pathfinder management system), and PLATO.

20. Thomas, Audrey M. and Buck, Martin, Analysis of Integrated Learning Systems and Their Use in Adult Basic Education Programs in British Columbia, Open Learning Agency, Marketing Department (Provincial Curriculum Publications) 4355 Mathissi Place, Burnaby, B.C. V5G 4S8, 1994.

    The study provides a descriptive analysis of six systems (Autoskill, CCC, Josten's INVEST, PALS, Pathfinder and PLATO) and how they are being used by instructors in adult basic education programs in the province of British Columbia. Instructors and students in colleges and school districts across the province were visited and interviewed for their opinions about each of the systems.

21. Wellburn, Elizabeth, Current Issues Regarding Integrated Learning Systems, Education Technology Centre of British Columbia, P.O. Box 2040 Sidney, British Columbia, V8L 3Y3, 34 pages, 1992.

    This occasional paper addresses major issues associated with the use of integrated learning systems in education, including do they promote learning, how is teaching effected in an ILS environment, implementation issues and conjectures on the future of ILS's. The report also presents a selected list of sources of evaluations of ILSs, brief descriptions of 5 ILS's (CCC, Classworks and ClassworksII, Podium, Jostens, and Wicat) and a recommended list of books and journals.

22. Wilson, Alexander, The Invest Program: A Computer-based System for Adult Academic Upgrading, A Pilot Project, Centre for Learning Assistance and Research, Department of Education, Mount Allison University, Sackville, New Brunswick, E0A 3C0, 32 pages, 1992.

    This study "was designed to determine whether a heterogeneous group of adult learners could make significant gains in academic achievement over eleven weeks of training on a computer-based learning system (INVEST), and how such gains would compare to those associated with more traditional learning approaches." (page 1, Executive Summary). The study group was representative of a "typical" group seeking academic upgrading through the community college system in Nova Scotia. The instruments used to measure achievement were the *Canadian Adult Ability Test (Level C)* and the *Test of Adult Basic Education (Level D)*.

CROSS-REFERENCING INDEX

The chart which follows cross-references six integrated learning systems with the selected resources described in the annotated resources section of this appendix. The items cited provide descriptions of the systems, evaluations of the system when used with students and/or sites where a system has been used or is in use. Thus, someone interested in the Autoskill system would consult items 4, 8, 13, etc. for further information. (The number of citations is not intended to reflect the success or popularity of a system.)

Autoskill	4, 8, 13, 17, 20
CCC	1, 5, 8, 9, 14, 15, 17, 19, 20, 21
Josten's INVEST	1, 8, 17, 20, 21, 22
PALS	5, 7, 9, 19, 20
Pathfinder	1, 2, 5, 6, 8, 9, 10, 12, 16, 19, 20,
PLATO	1, 5, 7, 8, 9, 17, 19, 20

INTEGRATED LEARNING SYSTEMS OVERVIEW CHART

AUTOSKILL

System:	Autoskill
Information current as of:	January 1994
Curriculum Range:	Comprehensive Diagnostic and Teaching Programs in the areas of Reading and Mathematics for K-12, ABE and Job Skills Training; Specific content for School and Adult Learners; ESL,FSL,SSL; Special Applications for Learning Disabled and educably handicapped.
Canadian Projects:	Programs adopted by the Ministries of Education for Ontario and Quebec; over 100 sites across Canada.
Canadian Content	Programs are 100% Canadian; originated and developed in Canada.
Available in French Language:	Yes, English, French, and Spanish; Linguists in each language were involved in the development process; Programs reflect the uniqueness of each language...not just simple translations.
Plans for Development of Canadian Materials:	Several new programs under development in Canada; involvement of Canadian educators and other experts; major field studies conducted in Canadian centres.
Hardware Requirements: Local Area Network (LANS)	IBM, IBM Compatible, MacIntosh and ICON Server Requirements: 386 or 486 CPU with 3.5" disk drive, 640K RAM minimum, 2MB RAM recommended, 40 MB free hard disk space; EGA, VGA, or SVGA monitor; Compatible Network Adapters: anything that supports MS SHARE.EXE, Novell or Novell compatible software and interface cards; Tape backup recommended.
Hardware Requirements: Stand-Alone System	IBM: 286 CPU with 3.5" disk drive, 640 K RAM minimum; Reading and Mathematics programs require 15MB for each program. The French Reading program requires 26MB; EGA, VGA or SVGA monitor; DOS version 4.0 or greater; Microsoft mouse; Voice Card interface- Echo PC II Speech Card or Artisoft Lanvoice. Headphones included or provided by Autoskill. Mac: Minimum Apple Classic, recommended Classic II or above; System 7 or greater recommended; 4MB RAM, 20 MB minimum free hard disk space (40 MB recommended)

System:	Autoskill
Hardware Requirements: Remote Access	Not available
Implementation Costs: (subject to change) LANS Stand Alone Remote Sites	Site Licensing agreements are available upon request. Autoskill programs come with software disks, user guides, orientation/training VHS videocassette and documentation. Training is available at Autoskill Corporate Office in Ottawa, as well as client on-site training seminars. Training involves two day instruction to groups up to 15. Charges for a two day group instruction are $750 per day. 1 - 8 Stations $ 7,995, 9 - 16 Stations $13,995, 17 - 32 Stations $23,995 1 - 6: $1,495 per unit 7 or more: $ 1,195 per unit Voice Card Interface: $195 Not available
Annual License:	No restrictions on amount of FREE support offered; No Annual license for Software.
Supports:	Free Technical Support through 1-800 number
Vendor:	Dr. Christina Fiedorowicz, President Autoskill International Inc. 331 Cooper Street Ottawa, Ontario K2P 0G5 613-235-6740

CCC-SUCCESSMAKER and Josten's INVEST

System:	CCC - SuccessMaker (MacIntosh Platform)	CCC - SuccessMaker (Windows Platform)	Josten's INVEST
Information current as of:	January 1994	January 1994	January 1994
Curriculum Range:	Over 3000 hours of instruction in the following: Mathematics K-12, Reading K - 12, Language Arts 2 - 12, Science 6 - 8, GED Preparation 9 - 12, Workplace Basics 9 - 12, English as a Second Language K - 12 Portfolio products which complement the courseware. Able to interface with third party software.	Same as for the MacIntosh Platform	ABE Literacy and Numeracy 0 -12 Writing Skills, Science, Life and Employability Skills, GED Prep; Additional Courses include: Compton's Multimedia Resource Centre, ESL, Substance Abuse, Job Task Link
Canadian Projects:	180 sites in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, New Brunswick, Newfoundland, Northwest Territories, and Yukon.	Same as for the MacIntosh Platform	40 sites in B.C., Manitoba, Ontario, New Brunswick, Nova Scotia, P.E.I., and Newfoundland
Canadian Content	Curriculum is based on the most current educational research including whole language, NCTM Standards, Higher Order Thinking Skills, cooperative learning environments, and outcome-based education.	Same as for the MacIntosh Platform	Math--metric system 100% correlated to Canadian Adult Achievement Test
Available in French Language:	No	No	No
Plans for Development of Canadian Materials:	Future development will be multicultural and global in nature.	Same as for the MacIntosh Platform	Focus group of Canadian educators; product development partnerships with Canadian software developers through local Canadian Business Partners, Canadian Social Studies. Site managers can insert any other Canadian materials through custom curriculum builder.

System:	CCC - SuccessMaker (MacIntosh Platform)	CCC - SuccessMaker (Windows Platform)	Josten's INVEST
Hardware Requirements: **Local Area Network (LANS)**	MacIntosh File Server: **Ethernet Networks**: Quadra 950, Min 16 MB RAM (dependent on Hard Drive Size), Min 2GB Hard Disk (de- pendent on Curriculum Package), Ethernet Cables, AppleShare 3.0.2 or better, System 7.0 or better, CD-ROM Drive, Image Writer or Laser Writer, Backup Device **Apple Talk Networks**: LC III, 520 or 475, Centris 610 or 650, Quadra 610 or 650, Min 8 MB RAM, Min. 40 MB Hard Disk, Local- talk Cables, Apple- talk Software, System 7.0 or better, Image Writer or Laser Writer, Backup Device Recommended: 9600 Baud Modem, U.P.S. System	IBM, Tandy, DELL, and Zenith File Server: 80-486 Processor, Ethernet or 10BaseT LAN Card, Min 12MB RAM (Dependent on Hard Drive Size), Min 2 GB Hard Disk (Dependent on Curriculum Package), 3 1/2" 1.44 MB Floppy Drive, Monochrome monitor and keyboard, Novell 3.1x or better, Dos 5.0 or better, Dot Matrix or Laser Printer, 2x or better CD ROM Drive and interface card, Backup Device, U.P.S. recommended, 9600 Baud Modem recommended	IBM, DELL, IBM compatibles File Server: 386 or 486, 8 MB RAM, 400 MB hd disk, Ethernet LAN card, Monochrome monitor, Novel Adv. Netware, Modem Admin. Work Station: 286, 386, 486, 1mb ram (2 recommended), printer, tape backup, CD-ROM (optional), VGA Monitor

System:	CCC - SuccessMaker (MacIntosh Platform)	CCC - SuccessMaker (Windows Platform)	Josten's INVEST
Hardware Requirements: Local Area Network (Continued)	Work Stations: LC III (68040 Processor for all new purchases), Min 8 MB RAM, Min 40 MB Hard Disk, 12" Colour Monitor, Built in Audio (AppleTalk Networks Require CD-ROM Drive at each station) * Additional Hardware and Software is required to access Analog or Digital Interactive Full Motion Video	Work Stations: 486 SX Processor, Min 4 MB RAM, Min 40 MB Hard Disk, 3 1/2" 1.44 MB Floppy Drive, 512 K Video RAM for 256 Colour Support, Mouse, Keyboard and VGA Monitor, Soundblaster Pro or Soundblaster 16 Audio Card and Headphones, Dos 5.0 or better, Windows 3.1 *Additional Hardware and Software is required to access Analog or Digital Interactive Full Motion Video.	Work Stations: 286, 386, 486, 3 1/2" drive, VGA colour monitor, digispeech adapter, mouse, VGA monitor.
Hardware Requirements: Stand-Alone System	MacIntosh LC III (68040 Processor for all new purchases), Min 8 MB RAM, Min 40 MB Hard Disk, System 7.0 or better, 12" Colour Monitor, Built in Audio, CD-ROM Drive at each station. * Additional Hardware and Software is required to access Analog or Digital Interactive Full Motion Video	IBM, Tandy, Dell or Zenith 486 SX Processor, Min 4 MB RAM, min 40 MB Hard Disk, 3 1/2" 1.44 MB Floppy Drive, 512 K Video RAM for 256 Colour Support, Mouse, Keyboard and VGA Monitor, Soundblaster Pro or Soundblaster 16 Audio Card and Headphones, 2X CD-ROM Drive and interface card, Dos 5.0 or better, Windows 3.1, Dot Matrix or Laser Printer *Additional Hardware and Software is required to access Analog or Digital Interactive Full Motion Video.	IBM, Dell or Compatible CD-ROM Digispeech Adapter
Hardware Requirements: Remote Access	Not available at this time.	Not available at this time.	MICRON 14,440 Baud modem Student Management system may be accessed via modem allowing for remote site management.

System:	CCC - SuccessMaker (MacIntosh Platform)	CCC - SuccessMaker (Windows Platform)	Josten's INVEST
Implementation Costs: **(subject to change)**			
LANS	Hardware $35,000 (Sourced by client from preferred vendor.) 10-Station Network (May require surcharge in isolated areas.) $64,930	Same as for the MacIntosh Platform	10 workstations $51,000 - $86,000 includes LAN with 10 workstations @ $28,000, courseware with perpetual license, installation and training ($23, 000 - $58,000)
Stand Alone	$13, 995 includes installation, training (3 days initial; 2 days second level), publications, consultation, and headset, $7,500 for each additional solo.		$7, 995
Remote Sites	Not available at this time		4 workstations $31, 980
Annual License:	$288/station	Same as for the MacIntosh Platform	None required. Optional Software Upgrades, Hot line support, remote diagnostics, Curriculum Consulting package, and Consumable supplies, $ 6,000 Standalone $450
Supports:	3 offices in Canada: Calgary, Victoria, St. Johns 1 - 800 Hotline	Same as for the MacIntosh Platform	1- 800 Hotline Phoenix, Nova Scotia Remote diagnostics via modem

System:	CCC - SuccessMaker (MacIntosh Platform)	CCC - SuccessMaker (Windows Platform)	Josten's INVEST
Vendor:	CCC sales representatives: Valerie Doenz (403) 235-9320 Matt White (604) 744-3816 Mun Batstone (709) 722-8651	Same as for the MacIntosh Platform	Tim Alison, President Maritrain Limited Canada wide toll free 1-800-363-6220

PALS, PATHFINDER, and PLATO

System:	PALS	Pathfinder	PLATO
Information current as of:	January 1994	January 1994	January 1994
Curriculum Range;	Adult Literacy and Adolescent in Reading, Writing and Touch Typing	Grades 4 through 12, Canadian Generic Core Curriculum; Employment/Job Skills; Entrepreneurial Skills; GED preparation and tests; Mentor Series Curriculum: B.C Specific academic grades 8 through 12.	ABE Literacy and Numeracy 0 -12 Core Courses, ESL, GED Prep, Life and Job Coping Skills,
Canadian Projects	Province of Saskatchewan, Ontario and Newfoundland	135 Sites in all provinces (except Quebec) and Yukon.	215 sites in every Province and Territory in Canada
Canadian Content	---	100% Generic Canadian Core Curriculum based on Provincial Ministry of Education guidelines; 18 B.C. specific grade 11 and 12 courses (14 courses completed; 4 remain in final development stage); Mentor Series curriculum completed to B.C. provincial requirements; multi-resource library includes a majority of Canadian approved materials.	Math--metric system Reading and Language Arts use Canadian English Spelling, American Social Studies
Available in French Language	No	le système d'apprentissage Formatique: Grades 4 through 10 and GED graduation.	No
Plans for Development of Canadian Materials	None	Site managers can insert ANY resource material, assignment, test questions or curriculum objectives that may be learner or program specific. As a result, curricula is being developed at Pathfinder sites across the country.	Track record of development. Canadian History may be available within one year. Management System enables integration of any DOS based lessons/applications

System:	PALS	Pathfinder	PLATO
Hardware Requirements: Local Area Network (LANS)	File server: 486 IBM ps/2 computer; Novell V 3.12; 1 GB disk; 16 MB RAM; CD-ROM Drive; Network Card (Token Ring or Ethernet) Workstations: IBM ps/2 286 or higher & monitor; Network card (Token Ring or Ethernet); DOS 5.0; 1 MB memory.	Any Novell-certified IBM or IBM-compatible fileserver; IBM or IBM-compatible Workstations 286, 386, or 486. 1 MB RAM minimum; Colour VGA Monitor required; file server 386 or faster, 4 MB RAM, 400 MB Hard Drive recommended. Hardware solution customized to meet the needs of the individual customer.	IBM, IBM compatibles File server: 32 bit, 486 processor, 4mb RAM, 32KB C, 1.5 G RB RAM hd disk, LAN card, VGA monitor, Novell Adv. netware, Detachable Keyboard, Dos 5.0 or higher, Printer, Tape backup. Work Stations: Single Disk, LAN Card, 2 mb Memory, VGA Colour Monitor, DOS 5.0 or higher.
Hardware Requirements: Stand-Alone System	IBM ps/2 286 or higher; ps/2 mouse; CD-ROM Drive; M-Audio Capture & playback adapter OR Digispeech; colour display.	Jumbo Tape Back-up Unit; PC Anywhere 4.5 Host; 9600 baud modem; Lexmark/IBM Personal Printer II 2380 with printer cable; 286 or higher IBM or IBM-compatible Workstation; Hard-disk with 100 MB of free space (more space needed if additional applications are required); 1 MB RAM memory; DOS 5.0 or higher; VGA colour monitor (minimum); uninterrupted power supply (recommended).	IBM or IBM Compatible Workstation: 386, 80 MB Hard Disk, CD ROM Unit, 2 MB Memory, VGA Monitor
Hardware Requirements: Remote Access	IBM ps/2 286 or higher; ps/2 mouse; CD-ROM Drive; M-Audio Capture & playback adapter OR Digispeech; colour display; modem; PC Anywhere.	J & L Chatterbox; Modems (Host & Remote Site); PC Anywhere link.	Remote Administration: IBM or IBM Compatible Work Stations: 386, 80 MB Hard Disk, VGA Monitor, 2 MB RAM, Telecommunications, 1 local and 1 remote modem (9600bps)

System:	PALS	Pathfinder	PLATO
Implementation Costs: (subject to change)			
LANS	Fileserver: $1200; Workstation: $2700; Software: $3500 (per workstation); For a 10-station network: Cost = ($1200) + 10($2700) + 10(3500) = $74,000	<u>Comprehensive Series Subjectware</u>: $45, 800 - $99,700 for a 10 workstation LAN complete with the Comprehensive Series Subjectware of up to 5 modules and related libraries with a total value of up to $39,000 to serve 30 to 50 concurrent learners: 1st year user fee, handling & shipping, site preparation and installation, and training. Hardware excluded. <u>Mentor Series Subjectware:</u> $37,775 - $54,620 for a 10 workstation LAN complete with the Mentor Series Subjectware of up to 4 modules and related libraries with a total value of up to $7000 to serve 30 to 50 concurrent learners; 1st year user fee, handling & shipping, site preparation and installation, and training. Hardware excluded.	10 workstations $54, 665 includes LAN with standard courseware, 1 yr. Licence, Installation and Training
Stand Alone	$2700/ workstation $3500/software	$9,975 - $17,875 for 1 to 4 Mentor Series Subjectware modules and related libraries,; 1st year user fee, handling & shipping, site preparation and installation, and training. Hardware excluded.	$7, 635
Remote Sites	---	$22,500	4 workstations $21, 500
Annual License:	---	$1,500 - $6,900 depending on the software package purchased (1st year user fee included in the purchase price).	$2,170 per workstation for first 3 years only
Support Services	1-800 Hotline	1-800 Hotline Toronto, Vancouver	1-800 Hotline Edmonton, Toronto, Vancouver, Newfoundland

System:	PALS	Pathfinder	PLATO
Vendor:	IBM Canada (EduQuest Canada) 3500 Steeles Avenue East Markham, Ontario L3R 2Z1	Pathfinder Learning Systems Corporation; 5 offices across Canada: St. John's, Calgary, NWT, Vancouver, Toronto office: 555 Richmond Street West Suite 700 Toronto, Ontario M5V 3B1 (416) 362-0007; contact Ed Carlin	TRO Learning (Canada) Inc., 5 sites across Canada, main office 48 St. Clair Avenue West Suite 901 Toronto, Ontario M4V 2Z2 Contact Katie Bush or Wilma Backus